



Issue 27: April, 2018: This e-bulletin is aimed at personnel in fisheries and aquaculture, at fish packers, processors, distributors, retailers and finally, consumers.

Omega-3s: - how much is in your salmon?

Consumers are increasingly aware of the health benefits of oily fish via social and other media and also through promotions by health professionals and supermarkets. Farmed salmon is often the oily fish of choice due to its ready availability and dwindling supplies of wild oily fish. Hence the importance of the current study which is a snapshot in time of the omega-3 status of raw farmed salmon on sale in retail outlets in Dublin and vicinity.

Health benefits of EPA and DHA

Health benefits of omega-3s EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid) are numerous. They have a cardio-protective effect and play a key role in regulating a wide range of functions in the body including blood pressure, blood clotting, brain development and function, inflammation, and more recently sepsis. A review of these aspects has been published in SeaHealth-UCD Supplement 27A, April, 2018. Recommended intakes of EPA and DHA range widely as evidenced in *Global Recommendations for EPA and DHA Intake* but an intake of about 0.5g/adult/day is a reasonable target based on current information. Eating oily fish is a preferred source to taking fish oil supplements.

Sampling and testing

Sampling spanned mid-October 2017 to early-March 2018. Five samples were purchased from retail outlets each week comprising four of farmed salmon (*Salmo salar*) and one a wild species, usually mackerel. In all 65 samples of farmed salmon and nine of mackerel were tested for EPA, DHA and linoleic acid (LA) by the method of Brunton *et al.*, 2015. A cooking trial was also conducted where salmon samples were cooked by poaching (95°C/10min), microwave (3.3min) and roasting (180°C/20min). A fourth cooked sample was obtained from a bain-marie in a restaurant to study the effect of warm-holding on omega-3 status.

EPA and DHA content

About two thirds of salmon samples tested had EPA+DHA contents in the range 0.54 to 1.09% and the mean value was 0.81% i.e. 0.81g/100g raw fish. This was lower than that of 1.03% for Irish

farmed salmon in 1991 (Cronin *et al.*, 1991). Similarly, the Norwegian Institute of Nutrition & Seafood Research reported a fall from 2.74 to 1.15% between 2005 and 2015 for farmed salmon in Norway due, presumably, to the inclusion of some vegetable oil in the fish feed; fish oil is becoming increasingly expensive due to shortage of supply. The high content of LA (comes from vegetable oil) found in farmed salmon in the current study relative to that in wild oily fish confirms the use of vegetable oil in the fish feed. This is viewed as a retrograde step as most consumers already have too much vegetable oil in their daily diet. The 65 retail salmon samples tested in the current study came from Scotland (25), Norway (22) and Ireland (18) and mean EPA+DHA contents were 0.86, 0.81 and 0.77% respectively i.e. Irish produced samples had the lowest content. Salmon produced non-organically had higher EPA+DHA content (0.83%) than organic samples (0.77%).

Cooking tests

Retention levels of EPA/DHA in cooked farmed salmon were excellent and ranged 86 to 88% for the three cooking methods. The cooked sample from the bain-marie had an EPA+DHA content of 0.92g/100g which shows the resistance of EPA/DHA to oxidation even when cooked fish is held at a warm temperature under lights.

Conclusions

- Farmed salmon samples purchased in retail outlets contained adequate amounts of EPA+DHA.
- Consuming 150g of cooked farmed salmon delivers about 1g of EPA+DHA which is equivalent to a two-day supply based on a target intake of 0.5g/adult/day.
- Salmon farmed organically had lower EPA+DHA levels than those farmed non-organically.
- EPA and DHA showed good stability to oxidation during cooking of farmed salmon.
- This study is a snapshot of the omega-3 status of farmed salmon on sale in Dublin and may or may not reflect the overall position in Dublin or nationwide.

SeaHealth-UCD Supplements 27A and 27B, April, 2018 contain more detailed outcomes from this study and are available from ronan.gormley@ucd.ie

References

- Brunton, N. P. et al. 2015. *Journal of Analytical Chemistry*, 70 (10), 1218–1224.
Cronin, D. et al. 1991. *Irish Journal of Food & Technology*, 15, 53-62.

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